

REMARKS

Claim Rejections - 35 U.S.C. §§ 102/103

The Examiner has rejected claims 1-2 and 4-6 under 35 U.S.C. § 102(b) as being anticipated by Ueno (US Patent 5,882,433). The Examiner has rejected claim 3 under 35 U.S.C. § 103(a) as being unpatentable over Ueno (US Patent 5,882,433) in view any one of Taniyama (US Patent 6,431,184) and Netsu et al. (US Patent 6,003,527).

It is Applicants understanding that the cited reference fails to teach or render obvious Applicant's invention as claimed in claims 1-6. In claims 1-6, Applicant teaches and claims a method of rinsing a wafer comprising spinning a wafer, and then exposing the spinning wafer to Di water "*while providing sonic waves to substantially the entire surface area of the wafer*" and then exposing the spinning wafer to a liquid or vapor having a lower surface tension than water. As such, Applicant teaches and claims exposing the entire surface of the wafer to sonic waves while exposing the wafer to Di water. The addition of mechanical energy helps improve the diffusion of the Di water on the wafer which improves the wafer rinsing process.

Ueno describes a spin cleaning method whereby a semiconductor wafer is held and rotated by a spin chuck and a hydrofluoric acid solution is applied from a chemical liquid nozzle 6. Pure water for rinsing is then applied from the rinsing nozzle 7. Ueno fails to disclose applying sonic waves to substantially the entire surface area of the wafer while rinsing the wafer. In fact, Ueno fails to disclose or

suggest any desire whatsoever for applying acoustic or sonic waves while cleaning or rinsing the wafer.

Taniyama discloses an apparatus and method for washing a substrate. Taniyama discloses utilizing a ultrasonic oscillator 23 to apply an ultrasonic wave to the top surface of a wafer during the washing operation. The ultrasonic oscillator 23, in Taniyama, has a length substantially equal to the radius of the wafer and is positioned not to extend over the axis rotation of the wafer (Col. 5, lines 60-65) (Col. 6, lines 16-18). Taniyama specifically describes that the ultrasonic oscillator 23 is not to exceed or extend across the axis or rotation of the wafer. Taniyama describes that if the ultrasonic oscillator 23 extends across the axis of the rotation of the wafer, the central region of the wafer would be washed excessively compared with the other region leading to a non-uniform washing degree over the entire surface region of the wafer (Col. 7, lines 31-40). Thus, Taniyama fails to teach providing sonic waves to substantially the entire surface area of the wafer while rinsing and specifically teaches away from providing sonic waves to substantially the entire surface area of the wafer.

Netsu et al. describes a cleaning apparatus and cleaning method. Netsu et al. describes a cylindrical cleaning solution spray 2 which provide a spray 3 onto a portion of a wafer 1. The cylindrical cleaning solution spray 2 includes a ultrasonic wave generating number which has a vibrator 67 which produces ultrasonic waves in the cleaning solution which is sprayed onto the wafer 1. The cleaning solution 3 which has the ultrasonic waves is only sprayed onto a small portion of the substrate as shown in Figure 1. Additionally, the acoustic waves are applied to the cleaning solution and not to the wafer. Thus, Netsu et al. fails to teach or suggest applying sonic waves to substantially the entire surface area of the wafer while rinsing the wafer.

Because neither Ueno, Taniyama, nor Netsu teach or describe applying sonic waves to the entire surface of a wafer while rinsing the wafer, the combination of said references cannot teach Applicant's invention as claimed in independent claim 1 as well as dependent claims 2-6.

Additionally, with respect to claim 3, Applicant teaches and claims that the sonic waves are applied to the backside of the wafer. Ueno fails to describe applying any acoustic wave at all. Taniyama describes applying acoustic waves from ultrasonic oscillator 23 to the top surface of the wafer. Netsu et al. describes providing acoustic waves to the chemical cleaning solution 3 which is applied to the top surface of wafer 1. As such, the cited references fail to teach or suggest applying sonic waves to the backside of the wafer as claimed by Applicant in claim 3.

For the above mentioned reasons, it is Applicant's understanding that the cited references fail to teach or render obvious Applicant's invention as claimed in claims 1-6. Applicant, therefore, respectfully requests the removal of the 35 U.S.C. §§ 102 and 103 rejections of claims 1-6 and seeks an early allowance of these claims.